

What is claimed is:

1. A gas sensor comprising a sensor element having a gas-introducing hole close to an end of said sensor element;

5 said sensor element including a first space for introducing a measurement gas thereinto from said gas-introducing hole via a first diffusion rate-determining section, a main pumping means for controlling a partial pressure of oxygen contained in said measurement gas
10 introduced into said first space to be substantially constant, a second space for introducing said measurement gas thereinto from said first space via a second diffusion rate-determining section, and an electric signal-generating converting means for reducing or decomposing a NO_x component
15 contained in said measurement gas introduced from said second space via a third diffusion rate-determining section to generate an electric signal corresponding to an amount of oxygen produced thereby so that a concentration of NO_x existing in said measurement gas is determined from said
20 electric signal, wherein

$$30\% \leq (W_c/W_e) < 70\%$$

wherein W_e represents a lateral width of said end of said sensor element, and W_c represents a lateral width of said gas-introducing hole.

25 2. The gas sensor according to claim 1, wherein said electric signal-generating converting means is a measuring

pumping means which reduces or decomposes said NOx component contained in said measurement gas introduced from said second space via said third diffusion rate-determining section, which pumps out oxygen produced thereby, and which
5 detects a current generated by pumping out the oxygen.

3. The gas sensor according to claim 1, wherein said electric signal-generating converting means is a detecting means which reduces or decomposes said NOx component
10 contained in said measurement gas introduced from said second space via said third diffusion rate-determining section and which detects an electromotive force corresponding to a difference between an amount of oxygen produced by said reduction or decomposition and an amount of
15 oxygen contained in a reference gas.

4. The gas sensor according to claim 1, wherein said sensor element further includes a heater for maintaining at least said first space and said second space at a
20 predetermined temperature, and

$$20\% < (L_a/W_e) < 50\%$$

wherein L_a represents a distance from a projected position of an end of said heater on an upper surface of said sensor element to said end of said sensor element.

5. The gas sensor according to claim 4, wherein said projected position of said end of said heater on said upper

surface of said sensor element is approximately coincident with a projected position of a starting end of said first space on said upper surface of said sensor element.

5 6. The gas sensor according to claim 1, wherein each of said first diffusion rate-determining section and said second diffusion rate-determining section is defined by a slit provided in said sensor element.

10 7. The gas sensor according to claim 1, wherein said sensor element further includes a fourth diffusion rate-determining section between said gas-introducing hole and said first diffusion rate-determining section;

15 a space between said gas-introducing hole and said fourth diffusion rate-determining section functions as a clogging-preventive space; and

 another space between said fourth diffusion rate-determining section and said first diffusion rate-determining section functions as a buffering space.

20 8. The gas sensor according to claim 7, wherein said fourth diffusion rate-determining section is defined by a slit provided in said sensor element.

25 9. The gas sensor according to claim 8, wherein a lateral width of said clogging-preventive space, a lateral width of said buffering space, a lateral width of said slit

of said first diffusion rate-determining section, and a lateral width of said slit of said fourth diffusion rate-determining section are substantially identical with each other.

5

10. The gas sensor according to claim 9, wherein said lateral width of said gas-introducing hole is substantially identical with said lateral width of said clogging-preventive space.

10

11. The gas sensor according to claim 1, further comprising an auxiliary pumping means for controlling a partial pressure of oxygen contained in said measurement gas introduced into said second space.

15